UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL

Distr.
GENERAL

E/ECA/NRD/CART/22
5 November 1986

ENGLISH
Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

Sixth United Nations Regional Cartographic
Conference for Africa

Addis Ababa, Ethiopia
10-17 November 1986

Contribution of Czechoslovak Surveyors and Cartographers to the Economical Development of Africa

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1. Introduction

Czechoslovakia belongs to countries with long tradition in geodesy, surveying and cartography. This tradition goes far to the 16th century. Since that time first map of Central Europe is preserved, including parts of today's Czechoslovakia which was made by important scientist and cartographer Nicolaus Claudianus and printed in the year 1518 at Nuremberg, Bavaria. Czech geodesists and cartographers took part in surveying outside the boundaries of their own country just more than 300 years ago. So e.g. in the 2nd half of the 17th century Augustin Herman was mapping the present US States of Virginia and Maryland. In the 19th century August Karel Kriz was surveying in Persia, Josef Wunsch in Kurdistan and Antonin Stecker the oasis of Kufra and El Djouf in the desert of Sahara.

The origin of Czechoslovak State Geodetic Service starts in the year 1918 when - after the fall of the Austrian-Hungarian Empire - the independent state of two brotherly nations - Czechs and Slovaks - was formed again after 300 years - the Czechoslovak Republic.

The contemporary organisational structure of the State Geodetic Service of the Czechoslovak Socialist Republic was established in the year 1954 when the union of civil geodetic and cartographic enterprises took place. It included also former private geodetic agencies. This forming of State supreme organism for administration of geodetic and cartographic activities in Czechoslovakia subordinated directly to the Government made appropriate conditions for securing the development of geodesy and cartography in our state.

State Geodetic and Cartographic Service of Czechoslovakia covers in present time all main sorts of surveying and cartography, including geodetic astronomy, establishing and preservation of trigonometric, levelling and gravimetric nets, topographic and cadastral surveys with the help of modern photogrammetic methods, automation and computer based techniques, thematic mapping on large, medium and small scales applying terrestrial methods as well as remote sensing and cartographic production of all sorts of maps and atlases.

The main task of the Czechoslovak State Geodetic and Cartographic Service is to fulfill the job for nation's own economical development, but the service is active in many spheres of international co-operation and in exporting of geodetic works and cartographic products. The Service organizes also training of specialists to be sent to foreign countries at Czechoslovak technical universities and at its own Education Center in the Research Institute for Geodesy, Topography and Center for Recent Crustal Movements, Geodetical Observatory which takes part in International Time and Latitude Services and in registration of Earth Tides and observation of the Earth satellites.

Czechoslovak geodetists and cartographers take an active part in the work of international governmental and non-governmental organizations, especially in the International Union of Geodesy and Geophysics, International Federation of Surveyors, International Society of Photogrammetry and Remote Sensing and International Cartographic Association and in the programs of the Committee for Space Research and Interkosmos.

There are many jobs done by Czechoslovak surveyors and cartographers during last years in foreign countries. They include:

- surveying and special geodetical jobs in connection with building of large-scale projects like highways, bridges, factories, etc.,
- cartographic production of different types of geographic and thematic maps and atlases - especially geological maps,
- activities of experts in UN programs or in bilateral co-operations,
- training of specialists for geodetic and cartographic jobs in foreign countries at schools, universities and training centers in Czechoslovakia,
- activity of Czechoslovak experts in consultations and expertising in governmental and non-governmental organizations and establishments.

In the next part I would like to give some examples of the activity of Czechoslovak surveyors and cartographers on the African Continent.

2. Activity of Czechoslovak surveyors and cartographers in Africa and their contribution to individual African countries

A numerous Czechoslovak expedition was working in Algeria in the years 1969-1971 at the Institute of vineyards and vine in Algiers to make necessary maps and establish the cadastre of vineyards. This Institute was founded in the year 1968 and was managing approximately 3,000 square kilometers of vineyards in the northern part of the country. The activity of Czechoslovak experts consisted in raising up organisation of centers of vineyard cadasters in separate regions (Algiers, Berroughia, Mostagan, Oran), in securing of their technical equipment, in working out techniques and technologies of map making (especially by photogrammetry), in preparing a project of mapping activities and in education and training of Algerian specialists.

Several expeditions of Czechoslovak surveyors were sent to Algeria in the years 1973-1975. They took part together with the specialists of the State Institute for Traffic Projects in Prague in preparation and realisation of the Transaharian Highway (project of the UNO) with participation of organizations from Canada and France. There was the work to prepare airborn photographies

of the supposed route of the highway inclusive the signalisation, marking and surveying of the axis of the highway according to the project in 50 meter sections, determination of main points of the arcs, levelling, surveys of longitudinal and cross section profiles of the highway on the length of 120 km. of the route. The work on the Transaharian Highway was continued on the territory of Niger and Mali.

Many Czechoslovak advisers were active in organisations of the Algerian Ministry of Urbanism and Construction in the years 1980-1986. Their activity was mostly based on evalusating of existing maps for initial projects of dwelling complexes and roads and in their surveying, eventually in determination of methods and direct managing of mapping on the scale 1 : 1 000 and its control. Experts were active at the former state enterprise CADAT, URBAN and at the General Directories in Algiers and at Jijeli.

In Libya was the activity of Czechoslovak surveyors and cartographers mostly connected with the geological survey with the enterprise Geoindustria Prague for the Libyan firm Industrial Research Centre in Tripoli. In the year 1973 there was a photogeological laboratory established with Czechoslovak contribution in this Institute, the instruments were installed and training of Libyan experts was secured. The results of wide geological surveys which had continued also in eighties on the scale 1 : 50 000 was cartographically elaborated on the scale 1 : 250 000 in the Czechoslovak enterprise KARTOGRAFIE Prague and finished by edition of geological maps in the years 1975 till 1983.

In the years 1983 till 1985 Czechoslovak surveyors maped the production area TAS which was built by the enterprise KONSTRUKTIVA Prague according to the contract made with the Military Industries Organisation of Libya in Tripoli. A micronet was established and polygonometric traverses were surveyed for laying out of individual building sites according to the project as well as levelling and mapping on the scale 1 :1 000 for the project of connecting roads and utility network.

Czechoslovak surveyors took part in several archeological expeditions with the Czechoslovak Academy of Sciences in Egypt. They surveyed monuments and documented excavations. They also worked at the construction of the Aswan Dam. In the years 1984-1986 geodetic survey and consultations for the study of recent movements of the Earth crust in the area of the Nubian Desert on the west bank of the lake Nasser was done. For Helwan Institute of Astronomy and Geophysics plans were prepared for extension of local geodetic net of seismo-active break of Kalabsha to a regional geodetic system for monitoring of recent movements and registering eventual seismic impacts to the body of the Aswan Dam. There was some training of Egyptian specialists in the International Center for Recent Crustal Movements in Czechoslovakia in the years 1985-1986 which was oriented to most precise geodetic operations connected with monitoring of crustal movements and their interpretation. Co-operation on monitoring of recent movements in the region of Aswan will continue in the future.

Czechoslovak experts acted on the First International Symposium on Recent Movements in Africa which was held in Addis Ababa in Ethiopia in the year 1981 and on the Second Symposium held in Cairo in 1984 which dealt about the determination of recent movements in seismic regions of Algeria, in rift region of Ethiopian Djibouti, on the project of monitoring of recent movements on the Egyptian break of Kalabsha and establishment of geodetical nets in seismic region of Nigeria.

In Liberia and Sierra Leone a group of Czechoslovak surveyors made astrogeodetic positioning in 1976, surveys of profiles of dams and rivers, geologica test pits and bore holes and at geophysical survey for the project on the border river of Mano. This job was done in co-operation with the enterprise HYDROPROJEKT Prague.

In Burkina Faso a Czechoslovak expert established land cadastre in the years 1968-1969.

In Somaliland in the same years a study for establishment of the photogrammetric section of the Somali Geodetic Service including necessary investment and training of personnel was made.

In Zambia astrogeodetic determination of coordinates of geologic bore holes was fixed by Czechoslovak specialists under the patronage of the UNO.

In Ghana there were surveys connected with the river Volta Dam including the inundation line determination of a new lake by Czechoslovak surveyors in 1968.

In Guinea a project for mapping in connection with the census of inhabitants and houses was done by a Czechoslovak expert in an UNO program. By his initiative a cartographic section of the National Statistic Bureau of Guinea was established.

A Czechoslovak expert took part in a project of mapping for census of inhabitants of Djibouti in the years 1981-1982.

A similar activity was done by Czechoslovak expert of UNO for Rwanda in 1980-1981.

Many specialists from African countries have studied geodesy, surveying and cartography in Czechoslovakia in the last years, especially on the Faculty of Engineering of the Czech Technical University in Prague, Technical University in Brno and at Slovak Technical University in Bratislava. On behalf of bilateral agreements there were arranged fellowships in scientific institutes and schools in Czechoslovakia and lectures and training by Czechoslovak geodesists, surveyors and cartographers in different countries of Africa.

3. Conclusion

This short overview of participation of Czechoslovak geodesists, surveyors and cartographers in economical development of Africa dealt only with the work and consulting services of specialists of the Czechoslovak State Geodetic and Cartographic Service, realised on bilateral agreements and within the projects of the UNO. This overview is far from being exhausting as it does not include participation of surveyors on investments realised by enterprises of other branches of Czechoslovak economy.

The goal of this contribution was only to inform the attendants of the Conference of the kinds of works done by Czechoslovak surveyors and cartographers during the past years in individual African countries and of the possibilities of Czechoslovak State Geodetic and Cartographic Service which fulfills during its existence its active service in geodesy, surveying and cartography in many countries and exports maps and atlases in foreign languages into the whole world.